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(54) Data sheet

(57) The invention relates to a layer-structured and flexible data sheet (2) in a security document comprising: a laser inscription layer (4) made of plastic material, on which at least some of the data of the data sheet can be printed utilizing laser inscription technique. In order to improve the bending endurance of the data sheet, a flexible back layer (5) that endures bending is attached to the laser inscription layer (4) by means of a laminate layer (6).

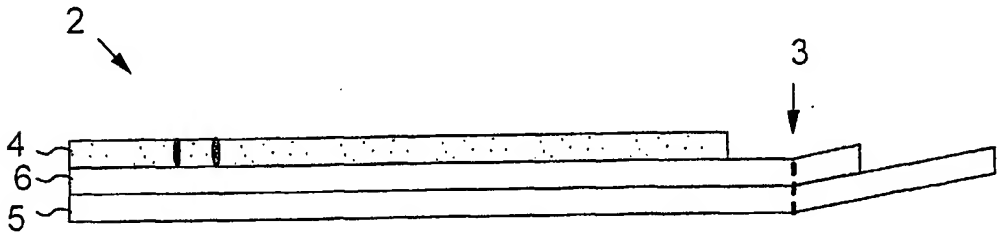

FIG. 2

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Description

[0001] The invention relates to a flexible and layer-structured data sheet of a security document, such as a passport. In the following the invention will be described primarily with reference to a passport, even though the invention can also be utilized in other security documents, in which a flexible data sheet is required.

[0002] One of the most important requirements of security documents is that the data featured on the data sheets thereof cannot be forged. In other words, when certain data is once stored into a data sheet, altering said data should be made as difficult as possible, preferably impossible.

[0003] A structural solution of a security document is previously described in connection with passports, where the data of the data sheet is recorded into a specific laser inscription layer utilizing laser inscription technique. Thus, the energy emitted from a laser beam causes the plastic material on the laser inscription layer to darken at the spots, on which energy is focused. Consequently, the desired data can be written and drawn onto the laser inscription layer. The laser inscription layer may, as is known in the art, be formed for instance of polycarbonate (PC). It has been proven in practice that altering the data stored into such a laser inscription layer afterwards for forging purposes is very difficult. In the prior art solutions, additional layers are typically attached to the laser inscription layer. Such layers include for example a printing layer, on the surface of which some of the data of the data sheet is printed.

[0004] A problem associated with the above prior art solution is that the materials applicable to be used on the laser inscription layer are not in general very liable to endure bending. However, such security documents exist that are supposed to endure bending. Passports represent an example of such security documents. As is known in the art, passports are made into booklet form, and similar bending properties are required thereof as of books in general. The known structure described above has therefore proven to be unsuccessful as regards passports, since the laser inscription layer breaks very easily owing to the repeated number of bendings.

[0005] It is an object of the present invention to solve the above problem and to provide a solution that significantly improves the bending endurance of a data sheet of a security document and particularly the tail part thereof. This object is achieved with a layer-structured and flexible data sheet of a security document comprising: a laser inscription layer made of plastic material, on which at least some of the data of the data sheet can be printed utilizing laser inscription technique. The data sheet according to the invention is characterized in that a flexible back layer that endures bending is attached to the laser inscription layer by means of a laminate layer.

[0006] The solution of the invention is based on the idea that the bending endurance of the data sheet and particularly the tail part thereof improves significantly, when a flexible back layer is attached to the laser inscription layer by means of a laminate layer, the back layer being provided with the required bending endurance properties. Practical tests have shown that as a data sheet of a known type is damaged after approximately 10 000 bendings, the data sheet of the invention endures up to 200 000 bendings without being damaged. The solution of the invention thus improves the bending endurance of the data sheet significantly in comparison with prior art solutions.

[0007] The preferred embodiments of the data sheet according to the invention are disclosed in dependent claims 2 to 5.

[0008] In the following, the invention will be described by way of example in greater detail with reference to the accompanying drawings, in which:

Figure 1 illustrates the structure of a security document, and

Figure 2 illustrates a first preferred embodiment of a data sheet according to the invention.

[0009] A security document 1 shown in Figure 1 is composed of a passport made to resemble a booklet. The passport includes a data sheet 2, whose data should be recoded in such a manner that altering said data afterwards for forging purposes becomes as difficult as possible, preferably impossible. As regards a passport, the data to be recorded on the data sheet includes personal data and a picture of the owner of the passport. The data sheet 2 is fastened to the passport using a stitch 3.

[0010] Figure 2 illustrates a first preferred embodiment of the data sheet of the invention. The data sheet 2 shown in Figure 2 can be utilized in the passport shown in Figure 1.

[0011] Figure 2 shows that the layer structure of the data sheet 2 seen from the end of one side. In Figure 2, a dashed line 3 indicates the stitch used to fasten the data sheet 2 to the passport.

[0012] In Figure 2, a laser inscription layer 4 made of plastic material is placed on top, on which data of the data sheet can be recorded utilizing laser inscription technique. Then the energy focused on the laser inscription layer 4 using a laser beam then darkens the laser inscription layer at desired spots. The required data can thus be recorded and drawn by moving the laser beam.

[0013] Since the bending endurance of the plastic materials applicable to laser inscription has proven to be poor, when used on the tail part of the flexible data sheet, the data sheet 2 is also provided with a flexible back layer 5 that endures bending. The back layer 5 is fixedly and firmly fastened to the laser inscription layer 4 throughout the entire surface thereof by means of a laminate layer 6. Hence, the back layer 5 extends to the tail part of the data sheet providing the tail part, which is placed at the stitch of the booklet and from where the booklet is folded, with an adequate bending endurance.

The material for the back layer can be selected so that it is made of a flexible and wear-resistant material.

[0014] Practical tests have shown that the following material choice is extremely advantageous. The laser inscription layer can be made of a bright carbonized polycarbonate layer (PC), which is also previously used in connection with passports. The flexibility and bending endurance properties required of the back layer are achieved when for instance an HPDE (High Density Polyethylene) is selected as the back layer material. A filled foamed polyethylene is in turn applicable as the laminate layer material, said polyethylene being commercially available under the name of Teslin. To fasten the polycarbonate fixedly and permanently to the HDPE has previously been very difficult. However, it has been observed in the present invention that Teslin allows fastening the materials mentioned above to one another in such a manner that the layer structure created as the final result can be used on the flexible data sheet in the security document and particularly on the tail part thereof. The materials mentioned above provide such a solution, in which the laser inscription layer is fastened to the back layer using a molecular binding.

[0015] When employing the above-mentioned materials, the data sheet can be manufactured in the following way. Firstly, a polycarbonate sheet is cut into stripes. The stripes are fastened to a Teslin-sheet using lamination at an elevated temperature. Thereafter, the created sheet is cut into stripes. The polycarbonate Teslin stripes are fastened to the HDPE sheet and the packet is laminated. The latter lamination is faster than the first one and it is performed at a lower temperature. The final result is that Teslin forms an adhesive layer between the polycarbonate and the HDPE.

[0016] The thickness of the layers of the layer-structured data sheet shown in Figure 2 can be selected in such a manner that the thickness of layer 4 is 0.1 mm, the thickness of the laminate layer 6 is 0.3 mm and the thickness of the back layer 5 is 0.2 mm. It is to be understood that the specification above and the Figures associated therewith are merely intended to illustrate the present invention. Therefore, the data sheet structure may also include other layers than the layers mentioned in the above examples. The variations and modifications of the invention will be obvious for those skilled in the art without deviating from the scope of the invention presented in the accompanying claims.

Claims

1. A layer-structured and flexible data sheet (2) of a security document (1) comprising:

   a laser inscription layer (4) made of plastic material, on which at least some of the data of the data sheet can be printed utilizing laser inscription technique, **characterized in that**

   a flexible back layer (5) that endures bending is attached to the laser inscription layer (4) by means of a laminate layer (6).

2. A data sheet as claimed in claim 1, **characterized in that** the laminate layer (6) attaches the back layer (5) to the laser inscription layer using a molecular binding.

3. A data sheet as claimed in claim 1 or 2, **characterized in that** the laser inscription layer (4) is made of polycarbonate.

4. A data sheet as claimed in any one of claims 1 to 3, **characterized in that** the back layer (5) is made of HDPE.

5. A data sheet as claimed in any one of claims 1 to 4, **characterized in that** the laminate layer (6) consists of filled foamed polyethylene.

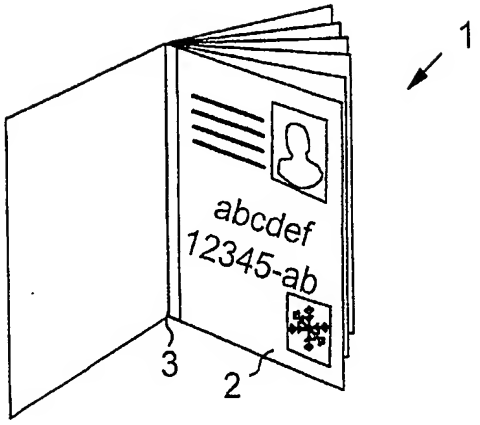

FIG. 1

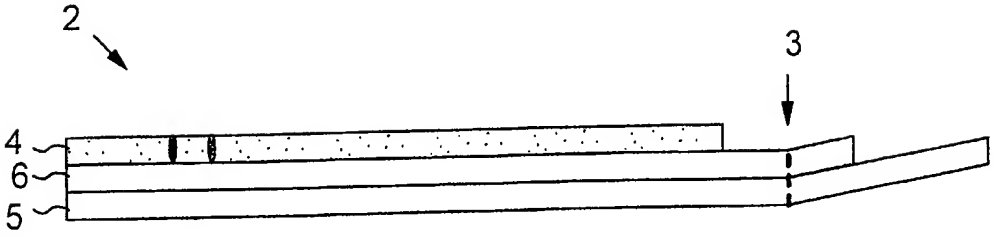

FIG. 2